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A classroom experiment on social responsibility

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Abstract

This work proposes a teaching-learning activity encouraging students to think and discuss on social values: respect, solidarity, and a like. The main goal is the student becomes aware of economic and social extend of her own decisions. To this purpose, we design an activity combining experimental economics and structured debate discipline. This activity is developed in three phases. First, students participate in a laboratory economic experiment based on ultimatum game. Second, a structured debate on a controversial social topic is organized, affirmative team against negative team. And third, a discussion class to collect students' opinions and final evaluation.

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1. INTRODUCTION

The present work offers a teaching-learning experience similar to Dickinson (2002), conducted to develop communication, analysis and critique skills from a social and economic point of view. With this purpose, the experiment joins two different methodologies: structured debate and economic experiment. On the one hand, the structured debate sets a framework for students to acquire and develop information and communication competencies. First, thesis and arguments require a previous searching and documentation work, and second the argument and rebuttal require a clear and precise communication style. On the other hand, the economic

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experiment allows the student to involve in the topic discussed beyond one person that watches, analyses and makes critiques, since her decisions have an economic interest to herself and her opponent.

Specially, this teaching-learning experience was carried on through two main phases. The first phase consisted of an economic experiment based on ultimatum game. Two weeks later took place the second phase: a structured debate. Students were distributed in teams of three or four students each, and then teams were paired. One team was assigned the role of affirmative group and the other the role of negative group. From students' proposals the issue to discuss was selected. Proposals should be on a social and controversial concern. It deserves to be mentioned the fact of students were enrolled in their first course of degree on Business and Administration (BA) (Economics Faculty of Valencia University in Spain).

The main goal of this activity is to create interest and consciousness in students on social responsibility issues with economic value. Through this experience, the student takes decisions, reacts when her own interest is involved and faces up the others' opinions on the debated issue.

In opinion of students expressed in ad hoc questionnaires, this activity allowed them to make a deep reflection on social values by an amusing and interesting activity, game-debate, which awakes logic reasoning and consciousness on the consequences of actions and decisions for oneself and the others.

The structure of the paper is the following: in section 2, the theoretic model is explained together a brief review of related literature. The section 3 is devoted to the design of the classroom experiment (game and debate). In section 4, a statistical analysis of experimental data is showed. Students' opinions on learning experiment are reported in the section 5. The section 6 concludes the paper.

2. Theoretical Model: Ultimatum Game

The ultimatum game (Güth et al., 1982) is a two-player sequential game. The players face a resource distribution problem under unequal bargaining conditions. The final distribution of resources between players depends on their individual decisions. The first player (proposer) proposes how to divide the resource between the two players, and the second player (responder) can either accept or reject this proposal. If the second player rejects, neither player receives anything. If the second player accepts, the resource is split according to the proposal.

The Fig 1 (a) shows the extensive form representation of an x proposal ultimatum game. The proposer offers the amount x of M . If the responder accepts, she receives x and the proposer $M-x$. If she rejects the offer, neither player receives any amount.

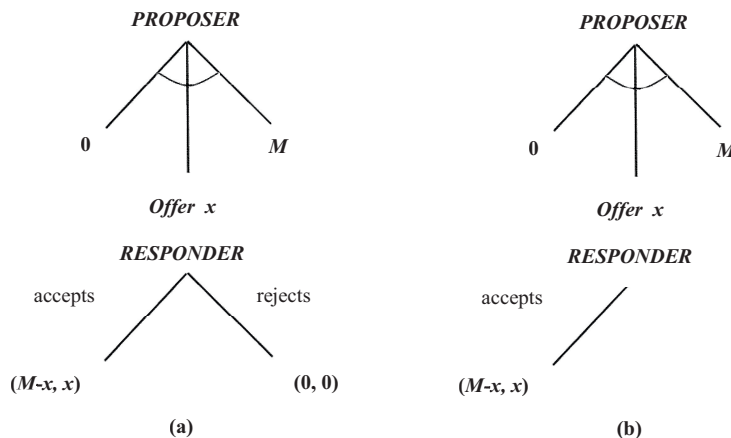


Figure1: Ultimatum game *versus* Dictator game

The game is solved by backward induction. Clearly, the responder's decision will be to accept all non-zero offers, since the payoff when she accepts is greater than when rejects the offer ($x > 0$). The proposer knows it, and will offer the minimum possible amount to maximize her own payoff ($M-x$).

According to the standard prediction of Economics Theory, on the one hand, the rational proposer will offer the minimum amount possible and keep the rest for himself, almost the whole. On the other hand, a rational responder will accept any small amount, because anything is better than nothing. However, this prediction is not corroborated by experimental economics studies. The experimental evidence is that responders punish excessively selfish proposers by rejecting their offers. Sometimes, proposers make 50%-50% offers due to a moral sense, or the fear of rejection and to loss everything.

A variant of ultimatum game is known as dictator game (Forsythe et al., 1994). The responder does not have any decision power (Fig 1(b)), therefore, the offer is never rejected. The distribution of resource only depends on the proposer's willingness to share.

The results of earlier experiments (Hoffman et al., 1994) on individuals' altruism behavior based on dictator game with anonymity of subjects show that the 46% of dictator players share the 30% of resources at least. The authors interpret anonymity as fairness indicator as a pure preferences phenomenon, and discuss that the apparent altruism behavior could be due to the social importance that the proposer gives to what the others think of him. Some alternatives explanation of anonymity effect are: (1) can eliminate the motivation to make donations because the beneficiary is not identified, and (2) proposer's decision depends on personal valuation but not the social valuation (Eckel & Grossman, 1996).

The fairness hypothesis has been tested by comparing the distributions of offers made by proposers in the ultimatum game versus the dictator game (Forsythe et al., 1994): if non-trivial offers are only by fairness, the both distributions will be equal. This presumption is not experimentally corroborated, since there are significant differences: i) the 22% of proposers in the dictator game play altruistically (at-least-50% offers), the number rises up to 65% in the ultimatum game. ii) The 0% of proposers in the ultimatum game offers the subgame perfect nash equilibrium amount, this percentage is 36% in the dictator game. Similar experiments support the previous results (Eckel and Grossman, 1996), the 62.5% (30 out of 48) of dictator players do not share anything, and the 8.3% of them does at least the 50%. However when the beneficiary player is a charity institution, dictators behave differently: the 27.1% (13 de 48) does not make donation and the 31.25% donates less than the 50%.

It is important to remark that the proposer assumes an opportunity cost related to the reject risk. This risk is only present in the ultimatum game, where the responder has decision power. The reject risk depends on the responder's reservation value that the proposer does not know. Therefore, the proposer will reduce the reject risk by increasing the amount offered.

3. Design of Classroom Experiment: Game-Debate

The experiment was run with students enrolled in the first course on BA Degree of the Faculty of Economics (Valencia University, Spain): 79 students distributed in two groups of 54 (23 males and 31 females), and 25 students (12 males and 13 females), respectively.

The first part of the classroom experiment, ultimatum game, took place for 90 minutes of a practice class of the subject "incorporation to university" at the middle of quarter. The second part was developed in the two next classes linked to the underlying topic: social responsibility. The week before the ultimatum game experiment,

students were informed about the activity, no information on content was given. The attendance was compulsory and the score summed up to the student's final score of subject. They were said that the minimum score possible was 0.25 and the maximum 1 point. A linear rule was used to compute the student's score. This rule was a function of the student's payoff, and the minimum and maximum payoffs of assigned group, responders or proposers. Two separated rooms were needed to run the experimental game and also the help of two mentor students. The proposer players were allocated in one room, and the responders in the other. In this way anonymity was guarantee. The students were cry-out called one by one, given an identification number, and the set of instructions. The game was played 10 rounds, in each round each proposer was randomly paired to a responder. The pairs were always different, thus reciprocity between the two players was not possible. The phases completing the game-debate activity are described below:

- **Game phase:** The teacher reads instructions aloud (15 minutes), and 10 rounds were played. Each round was organized as follows: (1) Students were said the amount of resource (pie) available. Each proposer took her sharing decision and wrote down her offer in a piece of paper that handed to the teacher (2 minutes). (2) Once responders received offers from proposers, they had 2 minutes to accept or reject them and fill up their decision sheet. (3) Next, the piece of paper was back to proposer, who took note of the responder's decision and the gain obtained in the round (2 minutes). After finishing the experimental game, students were asked to fill up a questionnaire: (1) What do you think is the underlying topic? (2) Find an example of the real life. (3) Do you think you would have played in the same way if your pair had been a friend of yours? (4) How do you consider yourself: selfish, altruistic, equalitarian? (5) How do you think you would have played the opposite role? (6) Which social values are important to you? (7) What of the activity do like or dislike you the most? (10 minutes)
- **Debate phase:** Through a debate activity the underlying topic (social responsibility) was developed from another point of view. Critical reasoning and synthesis skills were emphasized rather than verbal or non-verbal communication skills. One 90-minute class was dedicated to explain the structure of debate and students made a written practice on how to postulate arguments for and against, and another 90-minute class to the very debate. Students proposed some general concern questions to debate, they showed particularly interested into the followings: "Public vs Private Health Care Systems", and "Public vs Private University Studies". Students were distributed in teams of three or four students, the teams were paired, and assigned to the negative or affirmative side to debate. They were given a week's time to research and argue for and against. The class debate lasted 50 minutes, 25 minutes per pair. The formal debate was structured as follows: (1) The affirmative team opens the debate and presents their case for 3 minutes. (2) The negative team presents their case for 3 minutes. (3) The affirmative team presents their first rebuttal for 4 minutes. (4) The negative team presents their first rebuttal for 4 minutes. (5) The affirmative team presents their second rebuttal for 4 minutes. (6) The negative team presents their second rebuttal for 4 minutes. (7) The negative team presents their summary for 3 minutes. (8) The affirmative team presents their summary for 3 minutes and closes the debate. (9) The audience decided the most convincing argument and the winner team was determined.
- **Discussion phase.** In order to connect the game phase to the debate phase, students were encouraged to find out similarities and differences between both experiences. In doing so, they were able to bring together social and economic aspects existing in bargaining process between agents, individuals or institutions.

4. Quantitative Analysis of Experimental Data

This section is devoted to the quantitative analysis of experimental game played by students. Two sessions were run, the first one is the baseline case, and the second the treatment. In order to contrast the behavior of proposers, which is represented by the offer, from one session to another, the message "She/He is in your hands"

was added in second session instructions for proposers, only. We conduct a basic statistical analysis to study the raw data of the experiment.

4.1. Basic statistical analysis

In order to gain a first intuition on players' playing, we begin with the graph analysis of results of two experimental sessions. The box and whiskers diagram (Fig 2) elaborated on the percentage offered of pie in the ultimatum game is useful to detect the existence of homogeneity in mean or/and variance between the two groups of proposers and as well as the existence of extreme values. At first sight we find that interquartile range ($IQR = Q_3 - Q_1$) of the session 1 is greater than that of session 2 (0.05 vs 0.025). Therefore proposers of session 1 show a more opinion variability. There exist extreme values, although more compensated in the session 1 than in the session 2. In the session 1, extreme values produce a slight positive asymmetry of 0.29, whereas in session 2 very low extreme values produce a negative asymmetry of -3.78. There is a negligible difference between the mean values of both sessions (47%-48%). However by comparing empirical distribution functions of percentage offered by proposers of each session (Fig 2) significant differences are found. According to the two-sample Kolmogorov-Smirnov test, it rejects the null hypothesis H_0 : data come from the same distribution function ($D = 0.3231$, $p\text{-value} < 0.0001$). This evidence provides our first result: the two groups of proposers are not homogeneous, that is to say, they behave differently in relation to sharing decision.

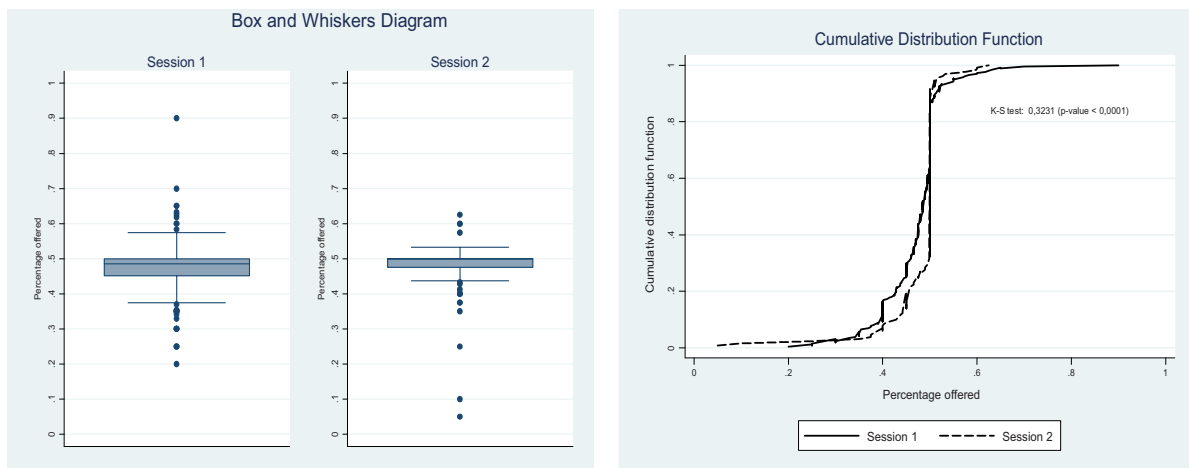


Figure 2: Box and Whiskers Diagram and Cumulative Distribution Function of experimental results of ultimatum game.

Recall that in each session students played 10 rounds, they were randomly and anonymous paired, and the pie size changed each. The pie available in each round was determined by random selection without replacement from the set $\{1, 2, 8, 10, 20, 35, 50, 75, 100, 200\}$. Fig 3 shows percentage offered per round by proposers of the sessions 1 and 2 in the ultimatum game. The blue line represents the average percentage, slightly below 50% in both sessions. The red (green) line represents the maximum (minimum) percentage. The width of bounds (max-min) session 1 is larger than those of session 2, what indicates that the first group of proposers shows more variability than the second.

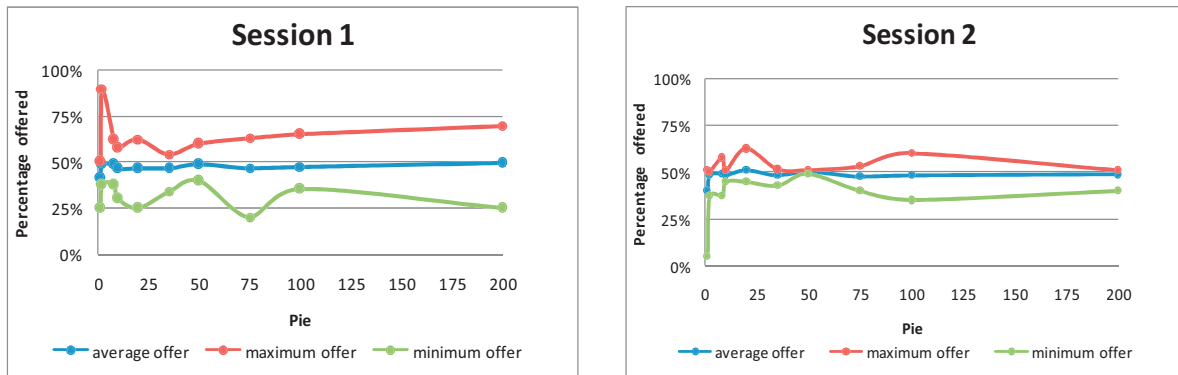


Figure 3: Average, maximum, and minimum percentage offered in ultimatum game.

Students were asked for additional information without effect in their gains: *How much would you offer if there was no reject risk (dictator game)? How much is the minimum offer acceptable to you?* The findings from proposers' answers are the followings: (1) The average percentage offered decreases in both sessions: between 16% and 24% in session 1, and between 1% and 8% in session 2. (2) The discrepancy of opinions increases between sessions. Proposers of session 1 show more solidarity than those that of session 2. The relative frequency histogram of percentage offered in each game (ultimatum *versus* dictator) and session let us detect the differences of behavior of the two groups of proposers.

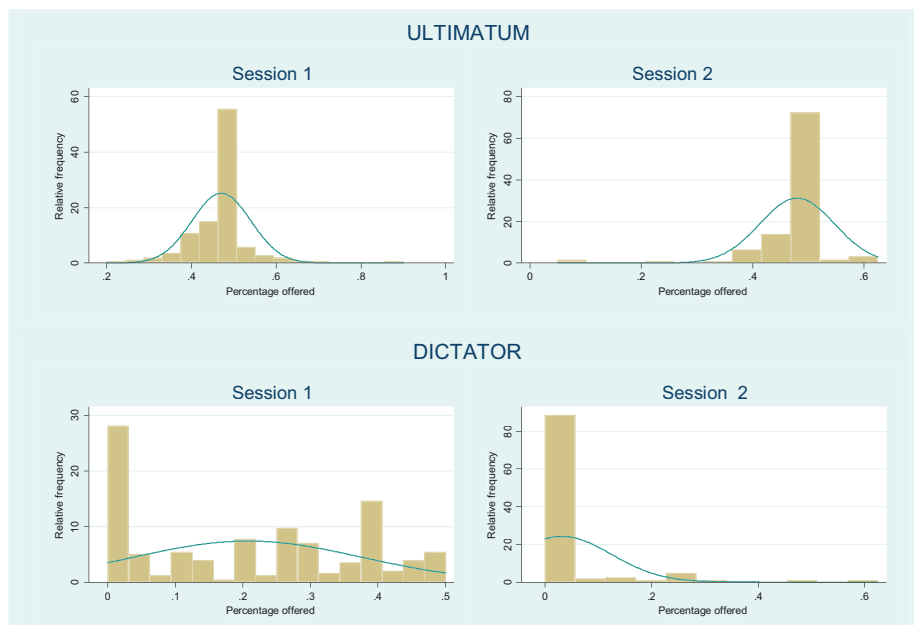


Figure 4. Histograms of relative frequencies

In relation to the question made to responders about the minimum acceptable offer we compute the envy coefficient by Fehr and Schmidt (1999). The responder will accept the offer x if she obtains a higher utility than rejecting: $U(1-x, x) > U(0,0)$. Then, responder's utility will equal the offer x minus the dissatisfaction by

receiving an amount less than that of proposer ($x < 1-x$). The responder's utility can formulate as $U(1-x, x) = x - \alpha(1-2x)$. Let x^* be the minimum amount that the responder would accept, the envy coefficient α is computed from the equation $U(1-x^*, x^*) = x^* - \alpha(1-2x^*) = 0$, as $\alpha = x^* / (1-2x^*)$. Table 1 shows the approximation to responders' envy degree, computed for the average minimum percentage required for accepting the offer. The Wilcoxon sum rank test, applied to the two independent samples, does not let reject the equal median null hypothesis, H_0 : responders of session 1 and session 2 have the same median envy coefficient (p-value = 0.1619). Now, we provide our second result: both groups of responders exhibit the same median envy degree.

In relation to the percentage of offers accepted: responders of session 1 accept between 50% y 89% of offers received (mean = 75%, median = 77%). The numbers for session 2 are 62% y 92% (mean = 83%, median = 85%). According to the Wilcoxon sum rank test the null hypothesis of equal median values is accepted (p-value = 0.1187).

We finish this section with two questions on gender. The first one: *Who reject more men or women?* Aggregated results (Fig 5) show that 27% (20%) male (female) responders reject the offer received. Therefore, men reject more than women. In session 1, this difference grows up to 10 points, whereas in session 2 the difference of 1 point is in favor of women.

The second question is related to proposers: *Who offer more men or women, and under which conditions?* Figs 6 and 7 represent the distribution of proposers by gender, level of offer, and session under ultimatum and dictator conditions, respectively. Under reject risk condition (Fig 6), the modal level of offer is between 25% and 50% of resource. The percentage of men and women offering this level are 87% and 84% in session 1, and 85% and 94% in session 2. In addition, in session 1 the 16% of women offer more than 50%, only 10% of men offer this percentage. Therefore, we can say that women are somewhat more generous than men in session 1. The opposite happens in session 2, 13% of men and 2% of women offer more than 50%. When there is no reject risk (Fig 7), the gender result holds for session 1: 47% of women offer more than 25%, whereas 72% of men offer less than 25%. However in session 2 the higher percentages of men and women are for zero offer (88% vs 68%). Therefore, when responder is under absolutely indefence conditions, it seems that women have more propensity to sharing than men. We conclude the third result: on average, women accept lower offer and make higher offer than men.

Table 1. Responder's envy degree, $\alpha = x^* / (1-2x^*)$

Pie	Round	Session 1	Session 2
1	2	4.60	11.50
2	5	4.26	12.83
8	4	9.11	4.61
10	6	6.18	4.95
20	1	7.22	7.00
35	9	8.99	3.62
50	8	9.50	5.05
75	7	5.10	3.59
100	3	8.17	4.12
200	10	15.96	5.21
average		7.909	6.248
median		7.695	5

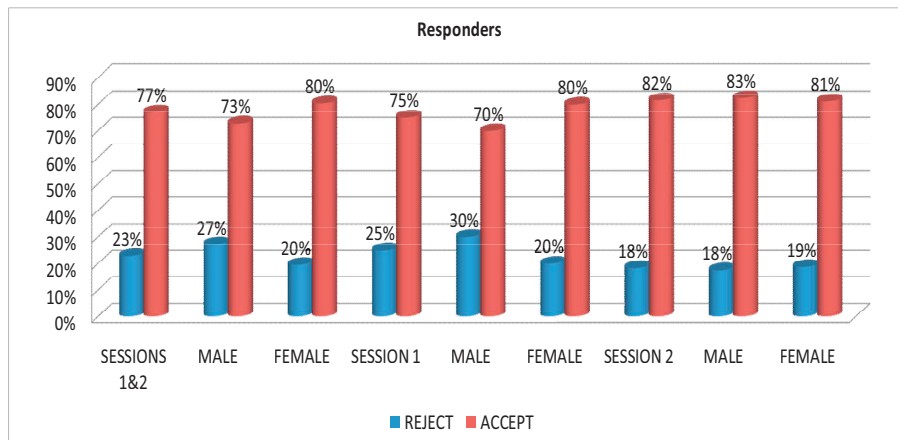


Figure 5. Distribution of responder's answer (by session, and gender).

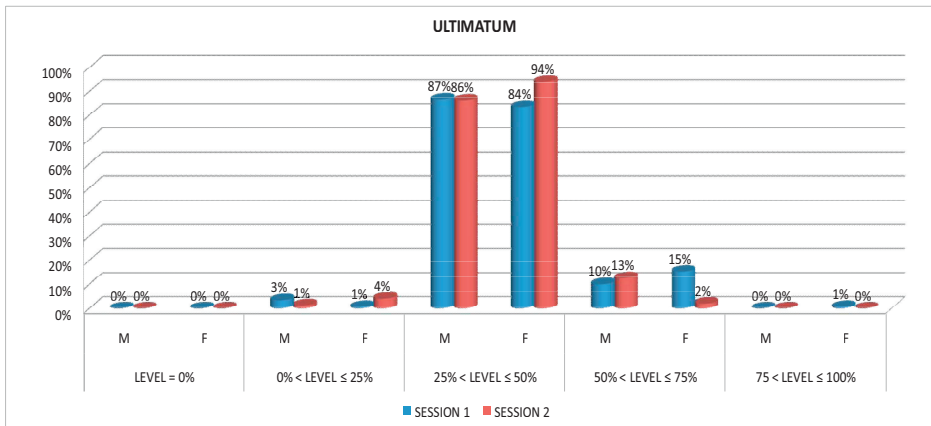


Figure 6. Distribution of ultimatum proposer's offers (by session, and gender).

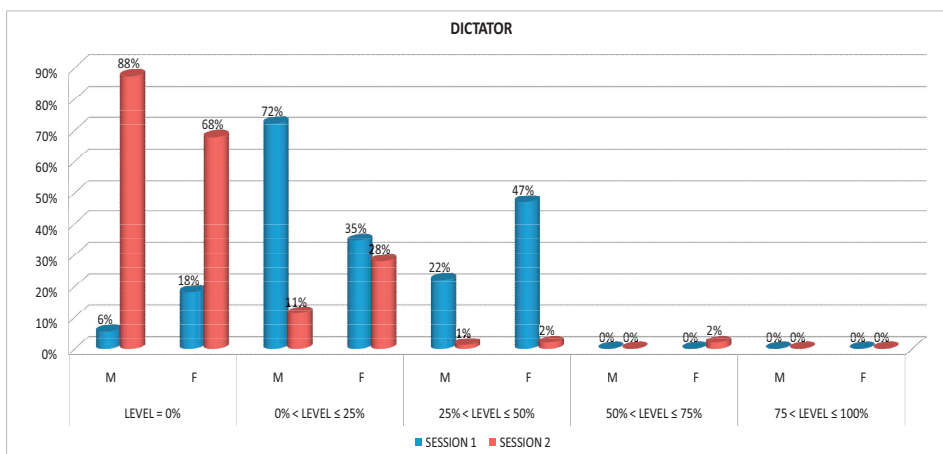


Figure 7. Distribution of dictator proposer's offers (by session, and gender).

5. Qualitative Analysis: Students' Opinions and Evaluations

Just finished the first phase of the experiment, ultimatum game, students were asked to fill up a questionnaire of some questions on the experience. We get useful and interesting information from answers.

First, students made an interpretation of game and the underlying topic. The results can be summarised as follows: (1) Most students thought of game a recreation of economic agents interaction, such as consumers-companys, institutions-users, and so on. (2) Some of them declared that the target was to maximise profits, exercise strategic skills and competitive spirit. (3) They found similarities between the ultimatum game and the supply and demand. Students associated the fact of accepting offers to the reservation price or maximum price that they would pay to buy a product. As a first conclusion, we can say that few students thought of undelying topic related to empathy or generosity towards the others. They understood the game as a competition one.

Second, we asked students to find real life examples organized under similar rules to ultimatum game. They gave some interesting examples: (1) Prices of products and consumer's decision to buy or not. (2) Studies on willingness to buy before launching a new product. (3) Labor market, the worker accepts or rejects offers depending on wages. (4) At home, sometimes one needs to bargain rooms or wages. (6) Auctions and bets.

In spite of main target was to encourage reflection on social fairness, some interpretations of students have been studied by literature, for instance, Gächter and Ferhr (2002) on labor market.

Third, according to Cabrales and Ponti (2011), the proposer's behavior could change if the responder was a relative or friend. The results of answers given by students are the followings: In session 1, the 40% of students would not change their offers, the rest declared that they had been more sensitive and equalitarian. In session 2, the 65% of students found some reasons to change their behavior. Some students claimed that one offers an equalitarian agreement to a friend. However, other students thought of getting advantage of friendship, because a friend accepts anything.

We think that the fact of a higher percentage of student proposers in session 2 changed their mind could be due to relax the idea of absolute power reinforced by the message "She/He is in your hands". This sentence could have induced a selfish behavior maximizing profit without taking into account others.

Fourth, students were asked to declare the self-perception on altruistic, selfish, and equalitarian character. In session 1, the 62% of students said to consider themselves as equalitarian, the 32% as selfish, and the 6% as altruistic. In session 2, the respective percentages are: 80%, 14%, and 6%.

This classification is in line with experimental results. On average, the percentage offered was around 47%. Therefore, except some outlier cases, most proposers offered an amount close to 50% of the whole.

Fifth, in order to contrast the behavior exhibited in ultimatum game, students were asked to express the minimum offer under no reject risk conditions (dictator game). The offers were not equalitarian at all. In session 1, students offered a percentage between 16% and 21%. In session 2, the average percentage fell up to 0%.

Finally, students were asked for social values considered important to them. The oftenest ones were: respect, equality, honesty, sincerity and friendship.

Two weeks later of the game experiment and after the debate class, a discussion class was developed to highlight differences and similarities between the ultimatum game experiment and debate on social topics. This class was structured in the following steps: (1) *Brainstorming*. We asked students to share ideas on the relationship between the game and the debate. In the blackboard, the teacher wrote words such as economic agents, public resources, private resources, human capital, taxes, distribution of wealth, bargaining power, social inequality, solidarity. As result, the topic of game experiment emerged in a natural way: *distribution of resources under unequal bargaining power*. (2) Make a comment of the following sentence by Ferh and Schmidt (1999): "Almost all economic models assume that all people are exclusively pursuing their material self-interest and do not care about "social" goals per se"(pag.817). More than 50% of students agreed. Students argued for a few minutes, some of them thought of being selfish is similar to nasty and inconsiderate to others. We clarified the term selfish as "one is in charge of her/his own responsibility" and this is maturity. (3) Explanation of the ultimatum game and dictator game in extensive form representation (Fig 1). Students concluded the results of the subgame perfect Nash equilibrium. (4) We showed the experimental evidence: proposers offer between 30% and 40% of pie, and responders reject offers less than 30% of pie. (5) Which factors could explain proposers' and

responders' behavior? Students answered that proposer's behavior could be due to reject risk. And they related responder's behavior to emotions. We concluded with Ferh and Schmidt (1999) model. (6) Finally, students' results obtaining in the game experiment were showed and commented. Higher grades were obtained by responder students accepting all offers received.

6. Conclusions

We found that the full activity proposed in this paper was a useful and interesting activity to involve students in an interactive exercise which increased sensitivity in the social responsibility and justice issue. In addition, analysis of students' answers and choices offer us some interesting conclusions.

Firstly, we can observe as within the ultimatum game, students tend to offer a piece of pie near 50%. We calculate students profits as a function of the student's payoff, and the minimum and maximum payoffs of assigned group, therefore the most rational behavior seems to be offer 50% of the pie.

However, within the dictator game, when there is no risk of rejection, strong differences in the proposers' behavior were found. Proposers try to obtain the maximum benefit offering a very little part of the pie, in some cases near to 0%. Under this situation, students didn't show any feeling of solidarity with the responders.

These results strongly contradict the opinion that students have about their selves. Specifically, in group 1, the average offers are about 20% and 62% of students consider themselves as an egalitarian, while in group 2, the average offer was around 0% and the 80% of the students defined themselves as egalitarian.

Secondly, results showed some behavioral difference between genders. On one hand, we found that men reject more than women. On the other hand, in group 1 women are somewhat more generous than men, while opposite happens in session 2. However, under no rejection risk it seems that in both groups women have more propensity to sharing than men.

Finally, the full activity proposed in this paper put students in a situation in which they have to take decision and chose a specific orientation for their decisions and opinions. When students realizes about the differences between their self-perception and their choices, they can reflect about the link between core values and everyday actions and decisions. They can also realize that discourses about values are not abstract theories but are part of life and daily decisions.

Therefore, the main goal of this activity was achieved. This experience creates interest and consciousness in students on social responsibility issues with economic value. They could take decisions, reacts when their own interest is involved and faces up to others' opinions on the debated issue.

We firmly believe that any university graduate, perhaps especially BA graduates, should acquire particular sensitivity in social responsibility and justice issues, in order to apply it in their work and daily lives. Therefore, subjects which encourage reflection and sensitivity in this field should be integrated into academic programs. Meanwhile, activities as the proposed in this work can be a useful tool, which allows students to gain maturity in thinking and feeling in decisions related to social responsibility and justice issues.

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